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Clinical case

Transient diplopia secondary to dental anesthesia. A case report



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ABSTRACT

Intraoral administration of local anesthetics is one of the most common dental procedures. Although this procedure is well known for its safety, complications can still occur. A 17-year-old female patient developed transient diplopia and ipsilateral lateral rectus muscle paralysis following administration of local anesthesia for right maxillary third molar extraction. The patient was informed and proper instructions were given regarding the complications. Complete resolution occurred within 2 h. In this article, we review the clinical examination and management of this uncommon occurrence.

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Diplopia temporária originada por anestesia dental: relato de caso

RESUMO

A administração intraoral de anestésicos locais é um dos procedimentos dentários mais comuns. Embora este procedimento seja bem conhecido pela sua segurança, complicações podem ocorrer. Paciente do sexo feminino, de 17 anos de idade, desenvolveu diplopia temporária e paralisia músculo reto-lateral ipsilateral após a administração de anestesia local para a extração do terceiro molar superior direito. A paciente foi informada e orientações adequadas foram passadas a respeito da complicação. A resolução completa ocorreu dentro de 2 h. Neste artigo vamos rever o exame clínico e o tratamento desta ocorrência incomum.

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Introduction

Although local anesthesia is routinely used in daily dental practice, occasionally patients may present with complications associated with its administration. These complications may have local effects (trismus, hematoma, edema, facial nerve paralysis, burning upon injection, postanesthetic intraoral lesions, infections, soft tissue injury, sloughing of tissues, needle breakage, anesthesia failure, and ophthalmologic complications)¹ or systemic effects (headache, syncope, allergy, and undesirable cardiovascular effects).²

Typical ophthalmologic complications after intraoral local anesthesia include accommodation disturbance, amaurosis (loss of sight), diplopia (double vision), enophthalmos (recession of the eyeball), miosis (contraction of the pupil), mydriasis (dilation of the pupil), ophthalmoplegia (paralysis of all muscles responsible for eye movements), and ptosis (drooping of the upper eyelid). Generally, these ophthalmologic complications have an immediate to short onset and disappear as the anesthesia subsides. These symptoms are most often attributed to the anesthetic solution reaching the orbit or nearby structures.³ Among the documented ophthalmologic complications, diplopia (39.8%) occurred most frequently, while ptosis (16.7%), mydriasis (14.8%), and amaurosis (13.0%) were less common. Other ophthalmologic complications such as accommodation disturbance, enophthalmos, miosis, and ophthalmoplegia were reported only in very few cases.⁴

Based on the extent of the surgical procedure, a specific technique for injection of anesthetic is chosen. When the procedure involves a small area, infiltration anesthesia may provide the necessary effect. On the other hand, a nerve block will provide enough anesthesia for a procedure involving two or three teeth, which is the case for third molar extractions.⁵ Regional block anesthesia is recommended for pain control during quadrant treatment and surgical procedures.⁵ The maxillary nerve block may also be used for extraction of superior third molars.

Complications associated with this type of anesthesia include damage to blood vessels and hematoma formation caused by perforation of the maxillary artery or penetration of the needle too far distally, reaching the pterygoid plexus; volume displacement of the orbital structures, producing periorbital swelling and proptosis; classic retrobulbar block, producing mydriasis, corneal anesthesia, and ophthalmoplegia; and regional block of the sixth cranial nerve, producing diplopia.⁵ When the abducens nerve (the sixth cranial nerve VI: CNVI) is damaged, the patient loses their ability to orientate the eye laterally and they are not able to abduct the eye on the affected side. This negative effect is due to the fact that the CNVI supplies somatic motor and proprioceptive fibers to the lateral rectus muscle which is responsible for lateral movement (abduction) of the eye.⁶ If this muscle is paralyzed by regional anesthesia, the patient may experience convergent strabismus (esotropia) and diplopia. The ocular muscles can also be indirectly affected during anesthesia of the maxillary nerve via the greater palatine canal, the infratemporal fossa, or the infraorbital sulcus.^{6,7} This article describes a case of temporary paralysis of the sixth cranial nerve secondary to dental anesthesia.

Case report

A 17-year-old melanoderm female patient attended the Department of Oral and Maxillofacial Surgery, Araraquara Dental School, São Paulo State University-UNESP, Brazil for extraction of impacted third molars.

Anesthesia of the inferior alveolar, buccal, posterior superior alveolar, greater palatine, and lingual nerve was performed before extraction of elements 18 and 48. For anesthesia, 5.4 mL of 2% mepivacaine solution with 1:100,000 adrenalin was used. The patient reported binocular diplopia 2 min after injection of 1.8 mL of anesthesia in the right mucobuccal fold in the direction of the pterygopalatine fossa. Clinical examination revealed right side paralysis of the sixth cranial nerve, apparent from absence of abduction movement of the right eye (Fig. 1).

The patient was informed about the complication, a cover was placed over the right eye, and proper instructions were given regarding the third molar extractions performed. The patient was recalled after 5 days.

At the recall appointment, no visual or motility alteration of the involved eye was observed. The patient reported that eye movements returned to normal approximately 2 h after injection of the anesthetic. Binocular diplopia and restriction of abduction of the right eye ceased, coinciding with the end of the local anesthetic effects (Fig. 2).

Discussion

Ophthalmologic complications are mostly associated with intraoral local anesthesia of the inferior alveolar nerve (45.8%) or the posterior superior alveolar nerve (40.3%), i.e., injections administered in possible risk-zones.⁴ Prior to extracting maxillary third molars, the anesthetic solution is usually injected behind the maxillary tuberosity, close to the posterior superior alveolar nerve which emerges from the maxillary nerve before entering the maxilla through the pterygozygomatic and infratemporal fossa.⁵

The CNVI emerges from the brainstem between the pons and bulbar pyramid. It courses behind the anterior inferior cerebellar artery and enters the cavernous sinus, leaving the skull through the medial end of the superior orbital fissure as it enters the orbit, running on and penetrating the medial surface of the lateral rectus which abducts the eye.⁷

There are several hypotheses explaining paralysis of the CNVI. One such hypothesis is the denominated venous diffusion concept.^{1,4,8} According to this, the anesthetic solution from the pterygozygomatic and infratemporal fossa enters the pterygoid venous plexus and reaches the cavernous sinus via the emissary veins through the ovoid, lacerum, or sphenoid foraminae, affecting the CNVI and causing neuroparalysis of the lateral rectus muscle.

Since the lateral rectus muscle is only innervated by the CNVI, any kind of interruption in its function results in diplopia as the patient loses their ability to abduct the eye. Other possible hypotheses include the possibility of the anesthetic solution penetrating the orbital fossa via the maxillary sinus wall.⁹ The anesthetic solution may also diffuse into the

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